J Gynecol Oncol. 2023 Jan;34(1):e7
https://doi.org/10.3802/jgo.2023.34.e7
pISSN 2005-0380·eISSN 2005-0399

JOURNAL OF GYNECOLOGIC ONCOLOGY

Original Article

Monitoring the activities of Italian colposcopy clinics before and during the COVID-19 pandemic

Giovanni Delli Carpini,[1] **Paolo Giorgi Rossi**,[2] **Luca Giannella**,[1] **Jacopo Di Giuseppe**,[1] **Nicolò Clemente**,[3] **Francesco Sopracordevole**,[3] **Maggiorino Barbero**,[4] **Giorgio Bogani**,[5] **Rosa De Vincenzo**,[6,7] **Massimo Origoni**,[8] **Francesco Cantatore**,[8] **Barbara Gardella**,[9] **Mattia Dominoni**,[9] **Ermelinda Monti**,[10] **Carlo Antonio Liverani**,[10] **Anna Viscardi**,[10] **Alessio Pagan**,[11] **Andrea Amadori**,[12] **Chiara Alessi**,[13] **Matteo Andolfatto**,[13] **Paolo Cattani**,[14] **Annalisa Pieralli**,[15] **Guido Stevenazzi**,[16] **Andrea Ciavattini**[1]

[1]Gynecology Section, Department of Odontostomatologic and Specialized Clinical Sciences, Università Politecnica delle Marche, Ancona, Italy
[2]Epidemiology Unit, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy
[3]Gynecological Oncology Unit, Centro di Riferimento Oncologico-National Cancer Institute, Aviano, Italy
[4]Department of Obstetrics and Gynecology, Asti Community Hospital, Asti, Italy
[5]Gynecologic Oncology Unit, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milan, Italy
[6]Gynecologic Oncology Unit, Fondazione Policlinico Universitario A. Gemelli, IRCCS, Dipartimento Scienze della Salute della Donna, del Bambino e di Sanità Pubblica, Rome, Italy
[7]Dipartimento di Scienze della vita e Sanità Pubblica, Università Cattolica del Sacro Cuore, Rome, Italy
[8]Department of Gynecology & Obstetrics, Vita Salute San Raffaele University School of Medicine, Milan, Italy
[9]Fondazione IRCCS Policlinico San Matteo, Pavia, Italy
[10]Gynecology Unit, Fondazione Istituto di Ricovero e Cura a Carattere Scientifico Ca' Granda-Ospedale Maggiore Policlinico, Milan, Italy
[11]ULSS 2 Marca Trevigiana, Treviso, Italy
[12]Gynecology Unit, Ospedale di Forlì, Forlì, Italy
[13]UOC Ostetricia Ginecologia, Dipartimento per la Salute della Donna e del Bambino, Azienda Ospedaliera – Università di Padova, Padova, Italy
[14]Italian Society of Colposcopy and Cervico-Vaginal Pathology (SICPCV), Rome, Italy
[15]Department of Biomedical, Experimental and Clinical Sciences, Division of Obstetrics and Gynecology, University of Florence, Florence, Italy
[16]Department of Obstetrics and Gynaecology, ASST OVEST MI, Legnano (Milan) Hospital, Legnano, Italy

Received: Apr 1, 2022
Revised: Jul 18, 2022
Accepted: Aug 29, 2022
Published online: Sep 30, 2022

Correspondence to
Andrea Ciavattini
Gynecology Section, Department of Odontostomatologic and Specialized Clinical Sciences, Università Politecnica delle Marche. Via Corridoni, 11, Ancona 60123, Italy.
Email: ciavattini.a@libero.it

ORCID iDs
Giovanni Delli Carpini
https://orcid.org/0000-0003-2849-4690
Paolo Giorgi Rossi
https://orcid.org/0000-0001-9703-2460
Luca Giannella
https://orcid.org/0000-0002-6405-8522
Jacopo Di Giuseppe
https://orcid.org/0000-0002-6162-6299
Nicolò Clemente
https://orcid.org/0000-0003-2748-3041
Francesco Sopracordevole
https://orcid.org/0000-0001-5562-4353
Maggiorino Barbero
https://orcid.org/0000-0002-7796-6028

ABSTRACT

Objective: To evaluate the impact of healthcare reorganization during the severe acute respiratory syndrome coronavirus 2 pandemic on Italian colposcopy clinic activities, focusing on cervical excision procedures, follow-ups for conservative management of low-grade lesions, and follow-ups post cervical excision.
Methods: Retrospective study conducted in 14 Italian colposcopy clinics. The number and clinical characteristics of cervical excisions, follow-ups for conservative management of low-grade lesions, and follow-ups after cervical excision were compared between the period March 1, 2019 to February 29, 2020 (pre-pandemic) and March 1, 2020 to February 28, 2021 (pandemic) with a Poisson regression analysis.
Results: In the pandemic period, the number of cervical excisions was reduced by 8.8% (95% confidence interval [CI]=−15.6% to −2%; p=0.011). Excisions were less frequently performed in the operating room (−35.1%; 95% CI=−47.6% to −22.6%; p<0.001), the number

Giorgio Bogani
https://orcid.org/0000-0001-8373-8569
Rosa De Vincenzo
https://orcid.org/0000-0001-7408-0435
Massimo Origoni
https://orcid.org/0000-0001-6690-3606
Francesco Cantatore
https://orcid.org/0000-0001-9489-2123
Barbara Gardella
https://orcid.org/0000-0002-0812-8995
Mattia Dominoni
https://orcid.org/0000-0002-6322-607X
Ermelinda Monti
https://orcid.org/0000-0003-2358-1568
Carlo Antonio Liverani
https://orcid.org/0000-0003-2796-1824
Anna Viscardi
https://orcid.org/0000-0002-5766-1446
Alessio Pagan
https://orcid.org/0000-0003-0804-4780
Andrea Amadori
https://orcid.org/0000-0003-3928-6221
Chiara Alessi
https://orcid.org/0000-0001-5366-5645
Matteo Andolfatto
https://orcid.org/0000-0001-7599-508X
Paolo Cattani
https://orcid.org/0000-0001-8474-7440
Annalisa Pieralli
https://orcid.org/0000-0003-3713-6879
Guido Stevenazzi
https://orcid.org/0000-0002-5453-2411
Andrea Ciavattini
https://orcid.org/0000-0002-8037-4947

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Author Contributions

Conceptualization: D.C.G., G.R.P., C.A.; Data curation: G.L., D.G.J., C.N., S.F., B.M., B.G., D.V.R., O.M., C.F., G.B., D.M., M.E., L.C.A., V.A., P.A., A.A., A.C., A.M., C.P., P.A., S.G.; Formal analysis: D.C.G., G.R.P., D.G.J., C.N., S.F., B.M., B.G., D.V.R., O.M., C.F., G.B., D.M., M.E., L.C.A., V.A., P.A., A.A., A.C., A.M., C.P., P.A., S.G.; Investigation: D.C.G., G.L., D.G.J., C.N., S.F., B.M., B.G., D.V.R., O.M., C.F., G.B., D.M., M.E., L.C.A., V.A., P.A., A.A., A.C., A.M., C.P., P.A., S.G.; Methodology: G.R.P., G.L., D.G.J., C.A.; Project administration: C.A.; Supervision: C.A.; Writing - original draft: D.C.G.; Writing - review & editing: G.R.P., C.A.

of patients from spontaneous screening was reduced by −14.0% (95% CI=−23.4% to −4.6%; p=0.003), and the CO2-laser technique was used less frequently (−30%; 95% CI=−45.1% to −15.0%; p<0.001). As compared to the pre-pandemic period, the number of follow-ups for conservative management of low-grade lesions was reduced by −26.7% (95% CI=−39.0% to −14.4%; p<0.001), and the follow-up appointments after cervical excision were reduced by −51.0% (95% CI=−58.1% to −43.9%; p<0.001).

Conclusion: The most significant impact of the healthcare reorganization during the coronavirus disease 2019 pandemic was on follow-ups after cervical excision. The resumption of disrupted activities should follow a risk-based prioritization, starting from women in follow-up after cervical excision. It is advisable that the trend of performing cervical excision as an outpatient procedure is maintained in the post-pandemic period.

Keywords: Colposcopy; Cervical Cancer; COVID-19 Pandemic; Conization; Screening

Synopsis

Follow-ups after cervical excisions were highly impacted during the pandemic. Cervical excisions and follow-ups for low-grade lesions maintained an acceptable rate. The resumption of activities should be prioritized according to individual risk. The trend of performing cervical excision in outpatient should be maintained.

INTRODUCTION

The pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has radically changed the organization of health systems worldwide. One of the main aims of public health during the coronavirus disease 2019 (COVID-19) pandemic was to reduce the impact on healthcare systems. In Italy, in the first phase of the pandemic (starting from March 16, 2020), all outpatient services have been postponed [1], including the HPV vaccination program, cervical cancer screening, colposcopy clinic activities, and outpatient surgery of the lower genital tract, except for cases which required urgent evaluation [1]. These decisions had an impact on a large percentage of the Italian population, considering that the HPV vaccination coverage on December 31, 2019 ranged from 41.6% to 70.4% for women aged 12–23 years and that the Italian cervical cancer screening coverage was 79.9% (48.7% organized screening and 30.8% spontaneous screening) in the period 2016–2019 [2,3]. In this context, scientific societies have provided guidance to advise clinicians and service providers on how to triage patients who needed a prompt evaluation in a colposcopy clinic from patients whose care could be safely postponed [2,3]. After the intensive adoption of preventive measures for SARS-CoV-2 diffusion, the consequent reduction in the incidence of new cases, and the improvement of the health facilities organization, the Italian Ministry of Health has provided new indications on how to resume disrupted activities during the first months of the pandemic [4]. The recommendations published on June 1, 2020, offered the possibility of a progressive reactivation of the outpatient services, with a particular interest in cancer screening programs [4]. The resumption of disrupted activities took place unevenly, considering the different pressure on the health systems in different regions and the increase in new cases in the last months of the year 2020 [5]. In May 2021, almost all Italian regions resumed outpatient services and screening programs.

This interruption of preventive strategies may have increased the time between an abnormal first-level test result and the following diagnostic tests. It may have caused the patients to miss follow-up appointments or delay urgent evaluation for symptoms suggestive of lower genital tract malignancies, with a potential lack of diagnosis and treatment of cervical cancer and its precursors.

As a matter of fact, in California, cervical cancer screening rates for 21–65 years old women dropped in 2020 after stay-at-home orders. After lifting the order, they remain lower than the corresponding 2019 months [6].

Predictive models have shown that COVID-19 related disruptions of cervical cancer prevention activities would increase cervical cancer cases by 2027 [7,8]. It is also reported that this increase will be primarily due to disruption of excisional treatment and follow-up appointments (colposcopy clinics activities), rather than delays in first-level screening, which will probably have a negligible effect on cervical cancer diagnosis [7,8].

Therefore, this study aims to evaluate the impact of healthcare reorganization during the SARS-CoV-2 pandemic on Italian colposcopy clinic activities by comparing the volume of activity of the 12 months before the pandemic with the first 12 months of the pandemic spread in Italy, focusing on cervical excision procedures, follow-ups for conservative management of low-grade lesions, and follow-ups post cervical excision.

MATERIALS AND METHODS

This retrospective study was conducted in 14 Italian colposcopy clinics, including 3 categories of patients: those subjected to cervical excision procedure, those in follow-up for conservative management of low-grade lesions, and those in follow-up after cervical excision in the period March 1, 2019 to February 29, 2020 (pre-pandemic period), and March 1, 2020 to February 28, 2021 (pandemic period).

Patients were considered as eligible in case of cervical excision procedure performed in the period March 1, 2019 to February 29, 2020, or March 1, 2020 to February 28, 2021, or last follow-up appointment for conservative management of low-grade lesions performed in the period March 1, 2019 to February 29, 2020, or March 1, 2020 to February 28, 2021, or last follow-up appointment after cervical excision performed in the period March 1, 2019 to February 29, 2020, or March 1, 2020 to February 28, 2021. Patients were exluded in case of missing data.

Cervical excisions were performed for the following indications: histopathological diagnosis at a cervical biopsy of high-grade cervical intraepithelial lesion (high-grade squamous intraepithelial lesion [HSIL]-cervical intraepithelial neoplasia [CIN]2 or HSIL-CIN3), histopathological diagnosis at a cervical biopsy of persistent (more than 2 years) low-grade cervical intraepithelial lesion (low-grade squamous intraepithelial lesion [LSIL]-CIN1), histopathological diagnosis at a cervical biopsy of LSIL-CIN1 in post-menopausal women with not-visible squamocolumnar junction, histopathological diagnosis at a cervical biopsy of adenocarcinoma in situ (AIS), or major colposcopic abnormalities with high-grade cervical cytology (see and treat approach). Regarding cervical excision procedures, the following variables were collected and compared between the 2 periods: the total number of cervical

https://doi.org/10.3802/jgo.2023.34.e7

excisions performed in each institution; the total number of operators that performed the excisions; patient's age (≤24, 25–34, 35–44, 45–54, 55–64, and ≥65 years); the approach to cervical excision (2-step approach with cervical biopsy and subsequent excision or see and treat approach); the surgical technique (loop electrosurgical excisional procedure [LEEP], CO2-laser, or cold-knife); the setting (outpatient vs. operating room); the screening modality (organized vs. spontaneous); the time between the excision and the screening test (high-risk human papillomavirus [HR-HPV] test, cervical cytology or both), collected as within the 3 or 6 months following the screening test or later; colposcopy (number of excisions with at least one previous colposcopy and number of excisions performed under colposcopic guidance); the time between the excision and the cervical biopsy, collected as within 1 or 3 months following the cervical biopsy or later; the definitive histology of the cone specimen; the margin status (negative, positive ectocervical, positive endocervical, both positive, or not assessable).

Follow-up appointments for conservative management (without cervical excision or destructive treatment) of low-grade cervical lesions (previous histopathological diagnosis of LSIL-CIN1) were scheduled as follows: execution of cervical cytology and HR-HPV test at 12 and 24 months from diagnosis, with possible execution of colposcopy and cervical biopsy in case of positivity of one of the 2 tests. The activities regarding follow-up after conservative management of low-grade lesions were assessed by collecting the number of follow-up appointments performed in each institution, the number of negative follow-ups, the number of "low-grade" positive follow-ups (defined as a result of low-grade cytology, low-grade histology, or HR-HPV positivity during follow-up), the number of "high-grade" positive follow-ups (defined as a result of high-grade cytology, high-grade histology, or AIS during follow-up), and the number of follow-ups with an invasive cancer diagnosis.

Follow-up appointments after cervical excisional treatment were scheduled as follows: execution of cervical cytology, HR-HPV test, and colposcopy at 6 months from the procedure, with possible execution of cervical biopsy in case of evidence of colposcopic abnormalities. At 18 months from the procedure, cervical cytology and HR-HPV test were performed, with colposcopy in case of positivity of one or both tests. During pandemic period, telephonic follow-ups were not performed in the included institutions. The activities regarding follow-up after cervical excision were evaluated by collecting the number of follow-up appointments performed in each institution, the number of negative follow-ups, the number of "low-grade" positive follow-ups (defined as a result of low-grade cytology, low-grade histology, or HR-HPV positivity during follow-up), the number of "high-grade" positive follow-ups (defined as a result of high-grade cytology, high-grade histology, or AIS during follow-up), and the number of follow-ups with an invasive cancer diagnosis.

The primary outcomes were: the total number of cervical excisions performed in the included institutions in the 2 periods (pre-pandemic and pandemic); the total number of follow-up appointments for conservative management of low-grade cervical lesions performed in the included institutions in the 2 periods; the total number of follow-up appointments after cervical excisional treatment performed in the included institutions in the 2 periods.

1. Number of subjects and study size

The sample size for the present study was determined for the 3 primary outcomes. The G*Power version 3.1.9 software was used to determine the required sample size for the 2-tailed Poisson regression (test family: z-tests) that was used to compare the total number of cervical excisions performed, the total number of follow-up appointments for conservative

management of low-grade cervical lesions, and the total number of follow-up appointments after cervical excisional treatment between the pre-pandemic and pandemic period, with an expected decrease (Expβ1) of 0.95, an α of 0.01, a power of 0.99, a mean exposure of 1 year, a binomial X distribution, a X parm ∏ of 0.5, and 3 different base rates (Expβ0) according to the 3 primary outcomes. The base rates (Expβ0) were determined considering the following estimates: 130 cervical excisions per year for each institution, 200 follow-up appointments for conservative management of low-grade cervical lesions per year for each institution, and 170 follow-up appointments after cervical excisional treatment per year for each institution.

Considering the parameters described above, a total sample size of 1,518 cervical excisions per year, 987 follow-up appointments for conservative management of low-grade cervical lesions per year, and 1,161 follow-up appointments after cervical excisional treatment per year were required.

2. Statistical analysis

The statistical software used was SPSS 27.0 (SPSS Inc., Chicago, IL, USA). The normality of each variable was evaluated by the Shapiro-Wilk test. Normally distributed variables were reported as arithmetic mean±standard deviation (SD), while not-normally distributed variables were reported as median and interquartile range (IQR). Qualitative variables were reported as numbers and percentages.

The comparison of the variables between the pre-pandemic and pandemic period was performed by running a Poisson regression analysis, considering as dichotomous predictor the pre-pandemic/pandemic period. The assumptions of independence of observations, Poisson distribution of counts, and equidispersion of the model were checked. Results were reported considering the coefficient estimates of the Poisson regression (B), with the 95% confidence interval (CI). A p-value <0.05 was regarded as statistically significant.

According to Italian legislation, the local ethical committee of the coordinator center (Comitato Etico Regionale Marche) took notice of the study protocol (No. CERM 2022/9). The manuscript was prepared according to STROBE checklist for reporting observational studies.

RESULTS

In the period March 1, 2019 to February 29, 2020 (pre-pandemic period), a total of 1,745 cervical excisions were performed in the 14 included colposcopy clinics, with a mean±SD number of cervical excisions per center of 125±66 and a median (IQR) number of operators per center of 3 (2–5). In the same 14 colposcopy clinics, 1,598 cervical excisions were performed in the period March 1, 2020 to February 28, 2021 (pandemic period), with a mean±SD number of cervical excisions per center of 114±73 and a median (IQR) number of operators per center of 3 (2–5).

A reduction between the number of excisions in the pre-pandemic and the pandemic period of −8.8% (95% CI=−15.6% to −2%; p=0.011) was evidenced. **Table 1** reports the comparison of the cervical excisions' characteristics between the pre-pandemic and pandemic period. Cervical excisions were less frequently performed in the operating room (−35.1%; 95% CI=−47.6% to −22.6%; p<0.001) during the pandemic period. CO2-laser technique was used less frequently (−30%; 95% CI=−45.1% to −15.0%, p<0.001). The number of patients from

Table 1. Comparison of cervical excisions characteristics between the pre-pandemic and pandemic period (Poisson regression analysis)

Characteristic	Pre-pandemic	Pandemic	Variation (%)	95% CI (%)		p-value
				Lower limits	Upper limits	
Total number of cervical excisions	1,745	1,598	−8.8	−15.6	−2.0	0.011
Age (yr)						
≤24	19	14	−30.5	−99.6	38.5	0.386
25–34	542	464	−15.5	−27.9	−3.1	0.014
35–44	591	580	−1.9	−13.3	9.6	0.748
45–54	363	335	−8.0	−22.9	6.8	0.289
55–64	181	155	15.5	−37.0	5.9	0.156
≥65	49	50	2.0	−37.4	41.4	0.920
Approach						
Two-step approach (cervical biopsy + subsequent excision)	1,410	1,304	−7.8	−15.3	−0.3	0.042
See and treat	335	294	−13.1	−28.7	2.6	0.102
Surgical technique						
LEEP	1,336	1,299	−2.8	−10.4	4.8	0.471
CO2-laser	397	294	−30.0	−45.1	−15.0	<0.001
Cold knife	12	5	−87.5	−191.9	16.8	0.100
Setting						
Outpatient setting	1,147	1,177	2.6	−5.6	10.7	0.534
Operating room	598	421	−35.1	−47.6	−22.6	<0.001
Screening modality						
Organized screening	813	788	−3.1	−12.9	6.7	0.532
Spontaneous screening	932	810	−14.0	−23.4	−4.6	0.003
Cervical excision performed						
Within the 3 months after the screening tests	1,171	1,067	−9.3	−17.6	−1.0	0.028
Within the 6 months after the screening tests	429	361	−17.3	−31.3	−3.3	0.016
More than 6 months after the screening tests	145	170	15.9	−6.2	38.1	0.159
Colposcopy						
Excisions with at least one previous colposcopy	1,738	1,586	−9.2	−16.0	−2.3	0.008
Excisions performed under colposcopic guidance	1,700	1,560	−8.6	−15.5	−1.7	0.014
Cervical excision performed						
See & treat approach	335	294	−13.1	28.7	2.6	0.102
Within 1 month after the cervical biopsy	411	382	−7.3	−106.0	6.6	0.303
Within the 3 months after the cervical biopsy	677	651	−3.9	−50.9	6.8	0.476
More than 3 months after the cervical biopsy	322	271	−17.2	−33.4	−1.1	0.036
Definitive histology after cervical excision						
Negative	94	108	13.9	−13.8	41.5	0.325
LSIL (CIN1)	233	233	0	−18.2	18.2	1.000
HSIL (CIN2)	508	521	2.5	−9.7	14.7	0.685
HSIL (CIN3)	762	635	−18.2	−28.8	−7.7	0.001
Squamous cervical cancer (pT1a1 – FIGO Ia1)	54	35	−43.4	−399.3	−0.8	0.046
Squamous cervical cancer (higher than pT1a1 – FIGO Ia1)	36	21	−53.9	−107.7	−0.1	0.050
AIS	25	21	−17.4	−75.5	40.6	0.556
Adenocarcinoma (pT1a1 – FIGO Ia1)	12	9	−28.8	−115.2	57.7	0.514
Adenocarcinoma (higher than pT1a1 – FIGO Ia1)	7	12	53.9	−128.4	147.1	0.257
Concomitant high-grade squamous and glandular lesion	5	1	−160.9	−375.6	53.8	0.142
Other definitive histology	9	2	−150.4	−303.6	2.8	0.054
Excision margins						
Negative margins	1,286	1,114	−14.4	−22.4	−6.3	<0.001
Positive ectocervical margin	167	225	29.8	9.8	49.8	0.004
Positive endocervical margin	162	143	−12.5	−35.0	10.0	0.277
Positive ectocervical and endocervical margin	91	63	−36.8	−68.9	−4.6	0.025
Not assessable	39	53	30.7	−10.7	72.0	0.146

Variation (%) = coefficient estimates of the Poisson regression (B) (%).
AIS, adenocarcinoma in situ; CI, confidence interval; CIN, cervical intraepithelial neoplasia; HSIL, high-grade squamous intraepithelial lesion; LEEP, loop electrosurgical excisional procedure; LSIL, low-grade squamous intraepithelial lesion; FIGO, International Federation of Gynecology and Obstetrics.

https://doi.org/10.3802/jgo.2023.34.e7

spontaneous screening was reduced by –14.0% (95% CI=–23.4% to –4.6%; p=0.003). A lower number of cervical excisions performed within 6 months after the screening tests emerged during the pandemic (–17.3%; 95% CI=–31.3% to –3.3%; p=0.016), as well as a lower number of cervical excisions performed more than 3 months after the screening tests (–17.2%; 95% CI=–33.4% to –1.1%; p=0.036). In patients in whom a see & treat approach was not performed, the median (IQR) period in months between the cervical biopsy and the excision was 2 (1–2) months in the pre-pandemic period and 2 (1–3) months in the pandemic period (p<0.001). A lower number of HSIL-CIN3 (–18.2%; 95% CI=–28.8% to –7.7%; p=0.001), squamous cervical cancer pT1a1 – International Federation of Gynecology and Obstetrics (FIGO) Ia1 (–43.4%; 95% CI=–399.3% to –0.8%; p=0.046), and squamous cervical cancer higher than pT1a1 – FIGO Ia1 (–53.9%; 95% CI=–107.7% to –0.1%; p=0.050) definitive histologies was noted in the pandemic period.

The number of follow-up appointments for conservative management of low-grade lesions was reduced by –26.7% (95% CI=–39.0% to –14.4%; p<0.001) during the pandemic period. **Table 2** reports the comparison of follow-up outcomes for conservative management of low-grade lesions between the pre-pandemic and pandemic periods. The number of negative follow-ups was reduced in the pandemic period (–45.4%; 95% CI=–62.8% to –28.0%; p<0.001), with a lower number of high-grade lesion/AIS (–167.4%; 95% CI=–707.9% to –44.1%; p=0.008).

A reduction of –51.0% (95% CI=–58.1% to –43.9%; p<0.001) in the number of follow-up appointments after cervical excision during the pandemic emerged. The reduction was more evident for high-grade lesion/AIS (–76.8%; 95% CI=–112.2% to –41.5%; p<0.001) than for the negative and CIN1 findings (**Table 3**).

Table 2. Comparison of follow-up for conservative management of low-grade lesions outcomes between pre-pandemic and pandemic period (Poisson regression analysis)

Outcome	Pre-pandemic	Pandemic	Variation (%)	95% CI (%)		p-value
				Lower limits	Upper limits	
Number of follow-up for conservative management of low-grade lesions	585	448	–26.7	–39.0	–14.4	<0.001
Negative	326	207	–45.4	–62.8	–28.0	<0.001
Low-grade lesion or HR-HPV-positivity	238	237	–4.0	–18.4	17.6	0.963
High-grade lesion or AIS	16	3	–167.4	–707.9	–44.1	0.008
Invasive	5	1	–160.9	–375.6	53.8	0.142

Variation (%) = coefficient estimates of the Poisson regression (B) (%).
AIS, adenocarcinoma in situ; CI, confidence interval; HR-HPV, high-risk human papillomavirus.

Table 3. Comparison of follow-up after cervical excision outcomes between pre-pandemic and pandemic period (Poisson regression analysis)

Outcome	Pre-pandemic	Pandemic	Variation (%)	95% CI (%)		p-value
				Lower limits	Upper limits	
Number of follow-ups after cervical excision	2,055	1,234	–51.0	–58.1	–43.9	<0.001
Negative	1,553	946	–49.6	–57.7	–41.5	<0.001
Low-grade lesion or HR-HPV-positivity	394	239	–50.0	–66.1	–33.9	<0.001
High-grade lesion or AIS	97	45	–76.8	–112.2	–41.5	<0.001
Invasive	11	4	–101.2	–215.6	13.3	0.083

Variation (%) = coefficient estimates of the Poisson regression (B) (%).
AIS, adenocarcinoma in situ; CI, confidence interval; HR-HPV, high-risk human papillomavirus.

https://doi.org/10.3802/jgo.2023.34.e7

DISCUSSION

The analysis of data from the present study has shown a −8.8% reduction in the number of cervical excisions performed in the 14 included colposcopy clinics in the pandemic period (March 1, 2020 to February 28, 2021). Follow-up appointments have also undergone a reduction during the pandemic period, with a percentage reduction of −26.7% for follow-up appointments for conservative management of low-grade lesions and −51.0% for follow-up appointments post-cervical excision.

The differences in the activities of the colposcopy clinics between the 2 periods can be mainly explained by the reorganization of the Italian healthcare system due to the adoption of preventive measures for SARS-CoV-2 diffusion and the need to reduce the impact on the workload of healthcare facilities.

This reorganization seems to have had a limited (−8.8%) impact on the number of cervical excisions performed in the included colposcopy clinics, probably because indications to excisional treatment were among those considered as "not-postponable" and which had to be guaranteed within 3 months at the latest [2,3]. This condition made it possible to keep secondary prevention of cervical cancer active during the pandemic period, maintaining diagnosis and treatment of high-grade intraepithelial lesions and invasive lesions to a volume of activity comparable to that of the pre-pandemic period. A similar reduction trend was identified in the study by Ivanuš et al. [9] of 2021, who reported that cervical treatments were around 10% below the reference value during the pandemic.

Cervical excisions procedures were less frequently performed in the operating room (−35.1%), while the number of outpatient procedures did not differ between the 2 periods. This was an expected result since inpatient operating rooms were mainly reserved for surgical emergencies or major interventions for oncological indications or were converted into intensive care beds. Moreover, a large number of anesthetists (who are needed for operating room procedures) were assigned to care for COVID patients in intensive care units (ICUs). It is desirable that this trend should be maintained, considering that outpatient procedures are comparable in efficacy and safety to inpatient procedures [10], require only local analgesia, reduce the length of stay, and have less impact on the healthcare facility. The 2021 European consensus statement on essential colposcopy has also indicated that local treatments should be performed, wherever possible, in outpatients and with local analgesia [11].

The analysis of data about the screening modality showed that the spontaneous screening was more affected by the reduction of activities than organized screening; this may have been linked to the fact that organized screening activities are entirely managed by the public health system, which could have resumed its activities earlier than other healthcare facilities where spontaneous screening can be performed.

During the pandemic period, we observed a higher reduction (−17.3%) in the number of cervical excisions performed within the 6 months after the screening test with respect to the number of cervical excisions performed within the 3 months after the screening test (−9.3%), and no difference in the number of cervical excisions performed more than the 6 months after the screening test. These differences can be interpreted as a delay in accessing second-level diagnostic and therapeutic procedures. However, the reduction was lower than that reported in the literature: Meggetto et al. [12] reported that 29.2% of patients with

high-grade cytology waited more than 6 months for a colposcopy during the pandemic in Ontario, Canada.

The higher number of positive ectocervical in the pandemic period was an unexpected result, which cannot be fully explained by the available data and solid conclusions cannot be drawn.

The effect of colposcopic clinic activities disruption was even more evident when comparing the number of follow-up appointments after cervical excision between the pre-pandemic and pandemic period, which showed a decrease of −51.0%. This reduction could have had a significant impact on the efficacy of cervical cancer prevention, leading to missed diagnosis of both high-grade and invasive lesions in high-risk women, such as those in post-cervical excision follow-up.

Regarding the performed follow-ups, the comparison of outcomes showed a similar pattern to that observed in treatment with a larger reduction in the pandemic period, compared to the pre-pandemic period, of the most severe lesions (**Table 2**).

The most significant impact on the activities of Italian colposcopy clinics seems to have been on post-treatment follow-ups rather than cervical excisions or follow-ups for conservative management of low-grade lesions. In this context, the main challenge of the post-pandemic period will be the reintroduction of cervical cancer prevention services [13,14], and numerous factors will need to be taken into consideration: changes in resource availability, changes in women's willingness to undergo screening, the need for social distancing, and the need for additional time for healthcare services [13,14]. The resolution of the backlog of disrupted services cannot rely solely on expanding service capacity with a generic re-calling of women who have not been screened, but it should first focus on high-risk women [8,13,14]. The level of risk can be defined by age, previous screen history, HPV vaccination status, smoking habit, immunosuppression, economic status, or geographical location [13,14]. Our results suggest that women in follow-up after excisional treatment should be re-called first since they experienced the most significant reduction of services during the pandemic. Risk-based prioritization, starting from women needing excisional treatment, colposcopy, or surveillance, allows to include a smaller number of women, which could have a more significant effect on the number of cervical cancer cases prevented [8].

An implementation for national cervical cancer screening services that may allow to reduce the number of accesses to healthcare facilities and COVID-19 transmission is HPV self-sampling, that should be promoted during disruption periods [3].

This study is strengthened by the large number of included cases from 14 colposcopy clinics distributed throughout the Italian national territory. One of the limitations is that we cannot exclude those factors other than the COVID-19 pandemic that can explain the highlighted differences; however, the only substantial changes in colposcopy clinics organization during the considered periods were those related to COVID-19 and, therefore, this bias may have a limited impact on the results. Moreover, since the included centers are a national reference for the pathology, we cannot rule out if the patients preferred to carry out the control exams close to their homes in a context of limited national travel due to the COVID-19 pandemic. Furthermore, in some geographic areas, urgent oncologic patients were referred to covid-free hospitals, usually oncological centers, while most of the participating centers in our study are multispecialty facilities. It is not possible from our data to distinguish between patients who missed their appointments due to COVID-19 positivity or due to healthcare services disruption.

In conclusion, the reorganization of healthcare services during the COVID-19 pandemic seems to have had the most significant impact on follow-ups after cervical excision, while cervical excision procedures and follow-ups for conservative management of low-grade lesions were less impacted. It is advisable that the trend of performing cervical excision as an outpatient procedure also continue in the post-pandemic period. The resumption of disrupted activities should follow a risk-based prioritization, starting from women in follow-up after cervical excision and maybe in those where a previous screen history is missing. Each clinic should define a list of patients from the highest to the lowest risk to organize re-calling of missed patients. Collecting data about the volume of activities in the post-pandemic period should also be a priority to monitor the resumption of cervical cancer prevention and verify the recovery of high-risk patients.

REFERENCES

1. Italian Ministry of Health. Guidelines for remodeling of the deferrable planned activity during COVID-19 emergency [Internet]. Roma: Italian Ministry of Health; 2020 [cited 2022 Mar 16]. Available from: https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=73675&parte=1%20&serie=null.
2. Ciavattini A, Delli Carpini G, Giannella L, De Vincenzo R, Frega A, Cattani P, et al. Expert consensus from the Italian Society for Colposcopy and Cervico-Vaginal Pathology (SICPCV) for colposcopy and outpatient surgery of the lower genital tract during the COVID-19 pandemic. Int J Gynaecol Obstet 2020;149:269-72. PUBMED | CROSSREF
3. Ciavattini A, Delli Carpini G, Giannella L, Arbyn M, Kyrgiou M, Joura EA, et al. European Federation for Colposcopy (EFC) and European Society of Gynaecological Oncology (ESGO) joint considerations about human papillomavirus (HPV) vaccination, screening programs, colposcopy, and surgery during and after the COVID-19 pandemic. Int J Gynecol Cancer 2020;30:1097-100. PUBMED | CROSSREF
4. Italian Ministry of Health. Guidelines for progressive reactivation of Linee di indirizzo per la progressiva riattivazione of the planned activities considered deferrable during COVID-19 emergency [Internet]. Roma: Italian Ministry of Health; 2020 [cited 2022 Mar 16]. Available from: https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=77493&parte=1%20&serie=null.
5. Italian Ministry of Health. Organizational Guidelines for the management of the COVID-10 emergency in the current pandemic phase [Internet]. Roma: Italian Ministry of Health; 2020 [cited 2022 Mar 16]. Available from: https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=77493&parte=1%20&serie=null.
6. Miller MJ, Xu L, Qin J, Hahn EE, Ngo-Metzger Q, Mittman B, et al. Impact of COVID-19 on cervical cancer screening rates among women aged 21-65 years in a large integrated health care system - Southern California, January 1-September 30, 2019, and January 1-September 30, 2020. MMWR Morb Mortal Wkly Rep 2021;70:109-13. PUBMED | CROSSREF
7. Wentzensen N, Clarke MA, Perkins RB. Impact of COVID-19 on cervical cancer screening: challenges and opportunities to improving resilience and reduce disparities. Prev Med 2021;151:106596. PUBMED | CROSSREF
8. Burger EA, Jansen EE, Killen J, Kok IM, Smith MA, Sy S, et al. Impact of COVID-19-related care disruptions on cervical cancer screening in the United States. J Med Screen 2021;28:213-6. PUBMED | CROSSREF
9. Ivanuš U, Jerman T, Gašper Oblak U, Meglič L, Florjančič M, Strojan Fležar M, et al. The impact of the COVID-19 pandemic on organised cervical cancer screening: The first results of the Slovenian cervical screening programme and registry. Lancet Reg Health Eur 2021;5:100101. PUBMED | CROSSREF
10. Leimbacher B, Samartzis N, Imesch P, Dedes KJ, Fink D, Canonica C. Inpatient and outpatient loop electrosurgery excision procedure for cervical intraepithelial neoplasia: a retrospective analysis. Arch Gynecol Obstet 2012;285:1441-5. PUBMED | CROSSREF
11. Redman CWE, Kesic V, Cruickshank ME, Gultekin M, Carcopino X, Castro Sanchez M, et al. European consensus statement on essential colposcopy. Eur J Obstet Gynecol Reprod Biol 2021;256:57-62. PUBMED | CROSSREF

12. Meggetto O, Jembere N, Gao J, Walker MJ, Rey M, Rabeneck L, et al. The impact of the COVID-19 pandemic on the Ontario Cervical Screening Program, colposcopy and treatment services in Ontario, Canada: a population-based study. BJOG 2021;128:1503-10.
PUBMED | CROSSREF
13. Castanon A, Rebolj M, Burger EA, de Kok IM, Smith MA, Hanley SJ, et al. Cervical screening during the COVID-19 pandemic: optimising recovery strategies. Lancet Public Health 2021;6:e522-7.
PUBMED | CROSSREF
14. Castanon A, Rebolj M, Pesola F, Sasieni P. Recovery strategies following COVID-19 disruption to cervical cancer screening and their impact on excess diagnoses. Br J Cancer 2021;124:1361-5.
PUBMED | CROSSREF